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Assessment and treatment of chronic work-related pain disorders in an outpatient university rehabilitation setting in The Netherlands

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Points of view of the assessment and treatment of chronic work-related disorders in a Dutch university rehabilitation setting are described. After a general introduction in which the basic philosophy is outlined, medical issues as well as issues regarding two treatment programs and the evaluation of functional capacity are described. The article ends with a brief description of current and future research programs.

Keywords: Non-specific chronic pain, occupational rehabilitation, functional capacity evaluation, chronic low back pain, disability, functional restoration, return to work

1. Introduction

Due to the constant increase of people with sick leave and disability, the problem of chronic and work related pain disorders is a major topic in Dutch healthcare and social security nowadays. The Netherlands has a population of about 16 million inhabitants. Six million of them belong to the working population. Almost one million receive compensation because of their (partial) incapacity for work. About 30% are unable to work

because of disorders of the locomotor system. Half of those are disabled because of low back pain and 30% because of psychological disorders such as the burned-out syndrome. In 65–70% of the workers with a disorder of the locomotor system a causal relation between the disorder and the job is supposed [8]. Since the non-specific etiology and the (symptomatic) treatment of most work-related disorders are comparable and low back pain may be considered the most important of these disorders, only the assessment and treatment of low back pain will be discussed in this paper.

1.1. Epidemiology

Depending on the occupational group, 20–40% of the Dutch working population regularly suffer from low back pain, i.e. pain in the lumbo-sacral region [11]. In general, low back pain has a short duration and during the pain period about 80% continue to work [16]. Of those people who stop working, 5–10% are still unable to work after three months due to the remaining low back complaints. Because of the long duration of the complaints (over three months) low back pain in these people is classified as chronic. In about 90–95% of the cases the nature of the complaints is nonspecific, thus making therapy difficult. Besides the tendency of low back pain to persist, there is also a tendency to relapse after final recovery. In specific occupational groups, the relapse rate in the first year after work resumption can be as high as 40% [6]. Based on the 1991 figures, van Tulder et al. [36] estimated the total direct and indirect costs spent on back pain in the Netherlands to be approximately US \$5 billion, equivalent to 1.7% of the gross national product. People suffering from chronic low back pain, although a minority in the low back pain population (about 5–10%), account for the majority of the total costs (about 70%).

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1.2. Basic philosophy

Based on changes in causal theories, through the years assessment and treatment of chronic low back pain have changed from pure medical to complex bio-psycho-social approaches [5,34,41]. This especially applies to rehabilitation since it is aimed at the restoration of functional abilities and reintegration in society. We support the view of Waddell [41] in which the development of chronic pain symptoms in non-specific disorders is considered the result of an abnormal course of acute pain for which physical, psychological, social and economical factors are responsible. The treatment is based on the concept that chronic low back pain is caused by an ongoing imbalance between a person's functional demands and functional capacity (Fig. 1). Every person has to fulfill, with his individual physical and mental capacity, a task in a certain environment. The task leads to both a physical and mental load for the worker. Physical and mental demands and capacity influence each other, but are in their turn influenced by the environment. In an optimal situation the total of capacities (functional capacity) is in balance with the total demands (i.e. functional demands). In the case of an imbalance, complaints such as low back pain will eventually start and probably continue until the balance has been re-established. From this point of view rehabilitation assessment and treatment have to deal with both functional load and functional capacity, which constantly are influenced by physical, mental, social and economic factors.

An important goal of rehabilitation treatment is re-establishing the balance between the functional capacity, especially work-related functional capacity, and the functional load. So work-related functional capacity is an important outcome variable. Although there are nowadays many methods available to measure work related functional capacity, the validity, reliability and sensitivity of these methods, however, are still unclear [29]. Issues regarding this are discussed in Section 5. Another problem is that the discussion over the most adequate rehabilitation approach in chronic low back pain is still continuing. Both physical [22,23,26–28] and behavioral (oriented) treatment programs are advocated as being superior. Both programs are discussed in Sections 3 and 5. In order to gain more insight into the mechanisms of the various programs it is necessary to study the relation between patient-, program- and outcome variables (Section 6). Also theory-driven program evaluation must be included in this kind of research [1].

2. Medical issues

Patients with chronic pain disorders of the locomotor system are considered as being a bio-psycho-social entity, to which the pain model of Loeser [21] is applied. The development of a chronic pain syndrome in a non-specific disorder is to be considered an abnormal course of acute pain for which somatic, psychological, social and economical factors are responsible [15,41]. Chronicity of non-specific disorders of the locomotor systems, as well as the resulting disability and handicaps, are considered a specific form of (pain-) behavior which requires a specific non-medical intervention [37].

2.1. Diagnostics

Patients are currently referred by general practitioners (GP) to the Outpatient Diagnostic Center (ODC), a special unit of the department of rehabilitation of the University Hospital Groningen. Indication for referral is difficulty of the GP's regarding diagnostics and treatment of the disorders in question. Patients with a new episode of low back problems lasting between six weeks and six month are seen in the ODC within two weeks after referral. Psychiatrists with specific knowledge and experience regarding work related syndromes will examine patients. At first, the diagnosing process is aimed to differentiate between specific and non-specific disorders. All patients will receive simple radiodiagnostics and an ESR-determination standardly. Extra diagnostics (CT, MRI, EMG) will only be used when specific disorders are suspected. When a specific medical disease is suspected, a referral is made within one week to a group of consulting physicians consisting of a neurologist, orthopedic surgeon and rheumatologist. Secondly, an evaluation of psychological and social factors, that may be maintaining factors in the pain syndrome, is performed. When psychological and social factors are deemed to play an important role in the non-specific pain syndromes, a clinical psychologist will evaluate the patient at short notice.

Of all patients admitted at the ODC, 60% are referred with low back pain symptoms and 30% with cervical symptoms. Almost all patients have relapse symptoms. Of the patients referred, 60% have had symptoms less than six months, 25% have symptoms between 6 months and a year and 15% are referred with symptoms lasting more than one year. The ratio between men and women is 2:3. Mean age of the referred patients is 40 years. 80% of all patients are working, 15% are

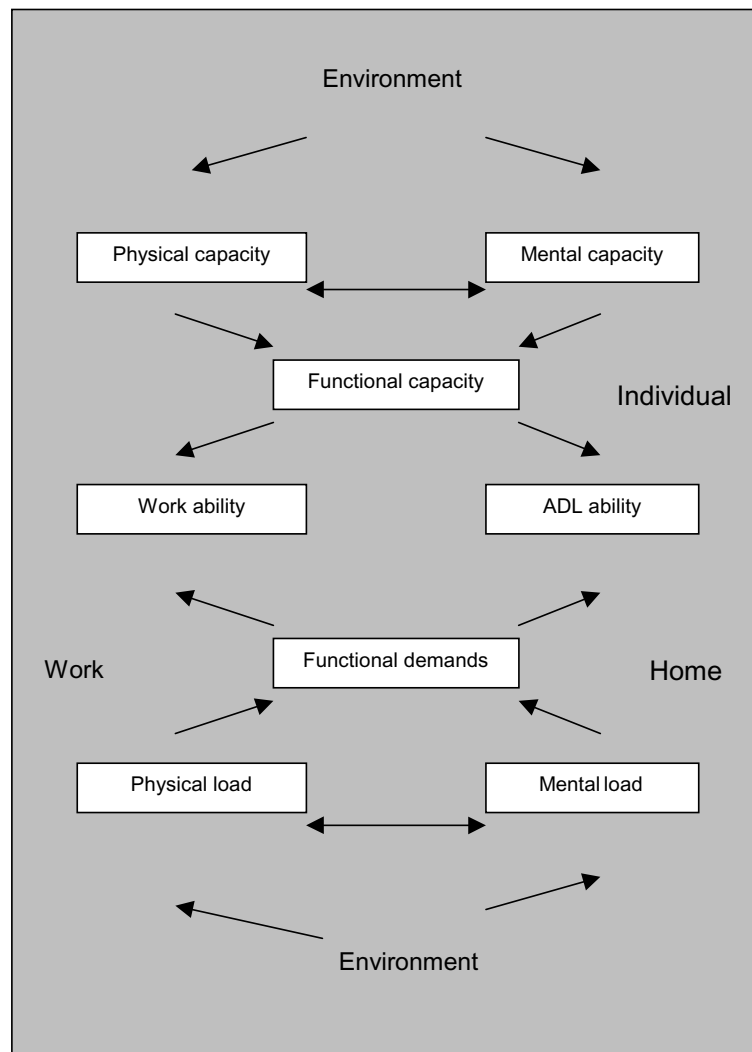


Fig. 1. Model for assessment and treatment of work-related disorders.

housewives and 5% are students or not working. More than half (51%) of all patients receive a financial compensation for disability. Of all patients referred, 1% are diagnosed with a specific disorder.

2.2. Treatments

2.2.1. Explanation and reassurance

55% of all ODC patients will be referred back to the GP's with no other intervention than a thorough explanation and reassurance of the benign character of the symptoms. Most of these patients have only questions about the origin of their pain and want to know whether it is malignant. They are explained that it is safe to regain activities and are advised to return to work. When

explanation and reassurance are deemed to be insufficient and the patient is motivated to return to work, a proposal is made for one of the two rehabilitation programs.

2.2.2. Rehabilitation

Of all ODC patients 45% are referred for an outpatient rehabilitation program at the Rehabilitation Center Beatrixoord in Haren, The Netherlands. There are basically two rehabilitation programs: an individualized backschooling program and an individualized multidisciplinary cognitive behavioral program [5]. The programs are described below in Sections 4 and 5. They both aim to have patients functioning normally in their private and working environment. For patients with

sick leave, the treatment is not started unless clear arrangements about return to work are agreed upon. Currently, 400 patients are treated per year. The amount of treatment of the backschooling program averages 10 sessions of 30 minutes each and the behavioral program averages at 30 sessions of approximately 1 hour each. Patients are treated twice per week. The total length of both programs averages between 2–4 months. The return to work process is integrated into both programs. Of all patients, 80% do actually return to work.

3. Individualized backschooling program

When biomedical and/or ergonomical factors are prominent (approximately 60% of the referred patients), an individualized backschooling program is carried out based on the principles of McKenzie [26], ergonomics and graded-activity. This program predominantly aims to influence functional capacity by an increase in physical capacity. In the backschooling program the physical capacity is established by asking the patient to perform maximally during the initial evaluation: cardiovascular endurance, muscular force and endurance and range of motion. A problem with most physical performance tests is that are to a high degree determined by psychological factors as well, such as cognitive and emotional components, as well as motivation. As the program is aimed at a successful reintegration of the patient in the work area, then rehabilitation analysis and treatment has to include work related aspects [9]. The patient's job demands are therefore explored, such as perceived work load, work satisfaction and sick leave due to LBP. Also, issues that are not directly work related but which do interfere with a successful return to work, such as family problems, financial problems and life events, are screened. It is, therefore, critical for a backschooling program predominantly based on biomedical principles, to include appropriate evaluation of psychological, behavioral and emotional aspects. In this initial evaluation the treatment goals should also be assessed [10].

4. Individualized multidisciplinary cognitive behavioral program

This program is applied when psychological and social factors are deemed to play an important role in the pain disorder (approximately 40% of the referred pa-

tients). The principles of cognitive behavioural therapy are described below.

Pain behaviour from a behavioural point of view is adaptive behaviour to acute pain. The function of this behaviour is to give the body time to heal. In chronic pain, however, this kind of behaviour is considered to be maladaptive or dysfunctional. Resting, avoiding strains or movements that might hurt, lead to high levels of muscle tension, loss of strength and physical condition and in the long run to a so called 'disuse syndrome'. For chronic pain the pain behaviour itself contributes to the persistence of pain. The question is why patients with chronic pain keep behaving as patients who suffer from acute pain. Several factors to explain this persistence of behaviour have been put forward.

One of these factors is called 'kinesiofobia', which means an irrational fear of pain and damage when one exerts himself. Kinesiofobia is one of the strongest predictors of chronicity as stated by Vlaeyen et al. [39] in their overview article on this subject. They also draw attention to the fact that various studies suggest that the necessary skills and physical condition to perform successfully in work diminish within four to eight weeks. When these two findings are combined a circular process can be predicted. When a patient returns to work after several weeks of sick leave on account of his low back pain, he will experience pain simply because he isn't 'in shape'. It is probably also this pain which convinces the 'kinesiofobic' patient that he has returned to work too soon and that work and pain are (causally) related. The statistics on sick leave indicate that this is what happens. The chances that the worker resumes his work decrease rapidly in time.

Closely related to kinesiofobia are the ideas the patient has about his condition, the so-called cognitions about pain. Turk et al. [37] showed that the cognitions are a better indicator of the level of activities than medical variables. If a patient is for example convinced that exercise will lead to an intolerable increase in pain or in damage to his body, he will not exercise and consequently his physical condition will retard.

A therapeutic approach to chronic pain would therefore consist of the following elements:

1. Educating the patient about pain and convince him that pain doesn't necessarily mean that he is in danger.
2. Gradually exposing the patient to exercise. In this way he may experience that no real harm is done.
3. Reducing the pain behaviour and substituting it for normal behaviour.

One of the major problems with this therapeutic approach is that pain behaviour not only is rewarding because it reduces pain in the short term but also because of the sympathy, attention and concern it generates. Several studies indicate that pain behaviour increases when it is followed by attention etc. It has been suggested that money in the form of workers compensation or litigation could also be a motivator for pain behaviour. Research results are ambiguous in this respect. Some studies find a negative correlation between compensation and treatment outcome and some don't. Dworkin et al. [4], who performed a meta-analysis came to the conclusion that patients who could return to work because they still had a job had significant better treatment outcome than those who already had lost their job and were financially dependent of their compensation. A behavioural explanation for this finding is that functional improvement is not rewarding for those patients who face loss of financial security when they improve. The patient is caught in a so-called "pain paradox" [3]. His request for help or treatment is "Cure me, but let me also be a patient because I can't afford not to be". The same goes for the patient who faces an exceptional high workload or conflicts at work when he resumes his activities. The consequence of this paradox for the patient's behaviour in treatment is that the patient will show that he does his utmost best, but that he doesn't make any progress.

In our opinion it is this paradox that needs to be solved before treatment starts. A thorough diagnostic procedure, in which the factors that contribute to the persistence of the pain behaviour are identified, is necessary. Test results and questionnaires alone will not give sufficient information as Schmand et al. [32] demonstrated. In their study they came to the conclusion that 33% of the patients who came for treatment and 55% of the patients who came for litigation matters performed far below their actual ability. A behavioural analysis must be part of the diagnostic procedure in order to unravel the factors that contribute to the patient's behaviour. The next step is to explain these factors to the patient, especially the possible paradox, and to help him in setting unambiguous healthy goals for treatment. When these conditions are fulfilled treatment will have a good chance of success.

5. Functional Capacity Evaluation

Functional Capacity Evaluations (FCE) are used to measure a person's capacities with regard to work and

to establish treatment goals and progress. FCE's have been in use in The Netherlands for less than a decade. Four systems are currently available.

Scientific reviews that have been published on FCE's [14,18,25,29,35], identify the lack of available data on reliability and validity of FCE's. The relevance and vastness of the issues at stake, both financially and medico-legally (for insurance carriers and the injured alike) as well as theoretically (how to determine the functional capacity of injured workers reliably and validly?) are great. The most recent reviews, however, are based on literature of 1997 and older. With regards to the IWS FCE, some significant developments have taken place since then. In this paragraph recent Dutch developments of the IWS FCE are presented and discussed.

5.1. Developments

5.1.1. Reliability

The issue of reliability appears to be most critical on the lifting and carrying items in FCE's. As evidenced by several publications [12,19,30,33,40] it seems possible to reliably determine effort level of lifting and carrying by using observational criteria only. During FCE's endpoints are, however, determined not only by observations (biomechanical endpoint), but also by heart rate (cardiovascular endpoint) and by the patient himself, usually on the basis of pain (subjective endpoint). Research is currently in preparation to study the reliability of the integration of the different endpoints.

5.1.2. Postural tolerance

The assessments of postural tolerances are important components of FCE's. Little is known about the reliability and validity of these tests. How should it be assessed? What can be considered "normal" testing performance? Relevant literature on this subject is scarce. A study is performed [31] using the IWS FCE protocols elevated work test (EWT) and forward bend test (FBT). The IWS protocol is maximized at 5 minutes, at which point a person's performance is considered to be normal (experience based). The population studied (44 healthy young adults) could hold the mentioned postures for approx. 15 minutes on average, with large inter-individual variances (4–50 minutes). Of all subjects, 91% were able to maintain the mentioned postures for at least 5 minutes. This result appears to be consistent with the experiences of the test developer, who considers a performance of less than 5 minutes to be "limited". The large variances cannot

be explained by physical factors only. Consistent with the model introduced in Fig. 1, it is hypothesized that motivational aspects account for a substantial portion of the variances.

5.1.3. Pain behaviour

A critical aspect in the reliability issue appears to be the determination of whether a patient worked to his/her maximal capacity. In our view, however, a patient's performance is always to a certain extent less than his/her capacities. Healthy, fully motivated individuals, such as world class athletes, are considered to be performing at near capacity level. Patients will perform at levels below physical capacity. One of the reasons for performing below capacity may be pain behaviour. Pain behaviour may have a significant impact on a patient's functioning and, therefore, on the results of the FCE [2,13,30]. If pain behaviour is as important as suggested, it should be assessed during an FCE.

A number of observation scales have been developed to map observable pain behaviour [20]. Among these scales is the UAB Pain Behaviour Scale (PBS), originally described by Richards et al. [38]. The PBS is completed rapidly and consists, after the removal of 2 items (medicine intake and daytime resting periods), of a list of 8 pain behaviors of which the frequency or intensity of occurrence can be registered using a 3-point assessment scale. The validity and inter- and intra-rater reliability of the Dutch version of the scale (PGS) is determined to be sufficient [38]. This study, however, was carried out in an inpatient setting using semi-standardized performances. The validity and reliability of the PGS in an FCE setting has not been determined. A pilot study [17] confirms its potential to be used reliably during an FCE. When, however, a patient is performing physically submaximal, it is meant or suggested that this is equivalent to a conscious attempt of the patient to manipulate the test. The evaluator merely documents the testing behaviour, but the psychologist is equipped to find out the reasoning of this behaviour.

5.1.4. Length of assessment

When taking into account the time needed for testing, analyzing the results and report writing, FCE's may take 3–6 hours to complete [14]. There is growing pressure from a number of sources to reduce the time spent on FCE's [14]. There is no data to support that a longer FCE provides "better" results than shorter FCE's. Shorter FCE's are likely to compromise on content validity, as they may not be able to cover

all job-specific physical demands as identified by the Dictionary of Occupational Titles, a publication of the United States of America Department of Labor. On the other hand, the added value of testing extra items is progressively less along the way. Future research should also be directed towards the development of a protocol that is balanced between investment of time, money, effort on the one hand, and outcome on the other. One of the strategies of working towards a more efficient IWS FCE protocol may be to reduce the number of individuals who will need a 2-day protocol. As demonstrated by Westmaas et al. [40], most individuals perform similarly on the second day of the FCE. If the characteristics of these patients are known, retesting on the second day will not be needed. Consequently, only those patients whose performances are expected to differ significantly, should be retested.

Prediction of maximal performance may theoretically also be of use to reduce the length of the FCE. To predict maximal postural tolerance, either by means of a pre-test prediction of the patient or by extrapolating subjective measures during testing, appears to lack sufficient reliability in healthy young adults [31]. When even healthy normals are unable to predict their performance reliably, it is expected that patients predict their performance at an even worse level. This is consistent with the findings of Matheson et al. [24], who have demonstrated an inverse relationship of chronicity of pain with perceived functional abilities. It appears that different constructs are measured when testing performance based or when testing perception based. Consequently, the choice of testing methods should depend on the construct one wishes to measure.

5.2. Conclusion

FCE's are potentially useful instruments to be used in various settings. Reliability and validity research, not reviews, published in peer reviewed internationally distributed journals are needed to establish a substantial and stable body of knowledge to support the correct use of FCE's.

6. Research programs

Recently, a research program on chronic low back pain disability has started in The Netherlands. The program is entitled: Chronic low back pain disability; integration of behavioral and physical approaches. The program is funded by the Dutch Organization for Health Care Research (ZON) and consists of three projects:

1. Investigation of the deconditioning syndrome hypothesis.
2. Evaluation of the reliability, sensitivity and prognostic value of, among others, the functional capacity evaluation according to Isernhagen.
3. A controlled clinical trial to study outcome (outcome variables) and effects (process variables) of rehabilitation programs based on behavioral and physiological principles. Perhaps this research program will make it possible in the future to fit the treatment program better to the patient and to make rehabilitation outcome more work-related.

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